NATIONAL AGRICULTURAL AVIATION ASSOCIATION

2003 ASAE/NAAA TECHNICAL SESSION

SPRAY MIX ADJUVANTS FOR SPRAY DRIFT MITIGATION

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Introduction

- Spray drift is a major issue for pesticide applicators
- Spray droplet size is the primary factor influencing drift
- Applicators should first concentrate on nozzle selection and operating conditions for controlling droplet size
- Drift control adjuvants are a secondary tool in controlling droplet size and spray drift

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Introduction

- Drift control adjuvants have been available in the modern marketplace for several years
- There are no product labeling or efficacy regulations for drift control adjuvants
- Applicators must be judicious in selection and use of drift control adjuvants
  - Experience
  - Technical information

Introduction

- Spray droplet size or Droplet Spectra Classification (DSC) now has specific definition in both technical and regulatory language
- ASAE Standard S572 AUG99 defines DSC in six categories – VF, F, M, C, VC, and XC
- Regulatory and product label language may specify droplet size either as DSC or volume median diameter, $D_{V0.5}$, e.g., 300 µm

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Objective

- Determine effectiveness of recently-introduced drift control adjuvants for typical aerial applications
- Bases of assessments
  - Increased droplet size
  - Reduction of fine droplet content
  - Resistance to pump shear degradation

Materials and Methods – Product Selection

- Twelve drift control adjuvants were selected for the study
  - Synthetic polymers
  - Natural polymers
  - Other agents
  - Some are liquid and some are dry formulations

Materials and Methods – Products Included in the Study

Airex DC	Direct
Array *	In-Place
Border EG 250 *	Intac Plus
Cell-U-Wett *	SanAg 41-A *
Control	Strike Zone PPS *
Corral Poly	Valid

* *Dry formulations*

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Materials and Methods – EC Blank Spray Mix

- 90 % tap water
- 10 % EC Blank
  - 92 % Aromatic 150 (ExxonMobil Corporation)
  - 6.4 % Toximul 3453F (Stephan Company)
  - 1.6 % Toximul 3454F (Stephan Company)
- Maximum adjuvant label rate for aerial application mixed in accord with manufacturers directions with gentle agitation with a centrifugal pump

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Materials and Methods – "Wind Tunnel"

Materials and Methods – "Wind Tunnel" Protocol

- PMS Laser Spectrometer
- Three replicates, scan through plume and size 12,000 to 18,000 droplets, immediately after mixing on the first pass through a gear pump
- Three replicates, scan through plume and size 12,000 to 18,000 droplets, after eight passes through a gear pump

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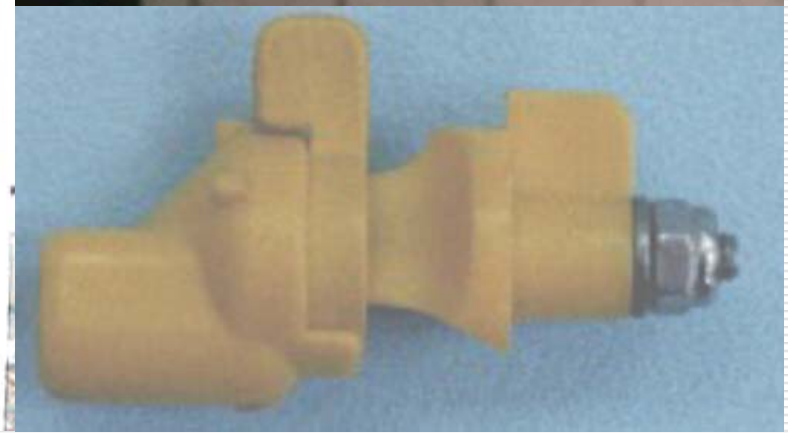
Materials and Methods – Spray Nozzle -- CP-03



Materials and Methods – Operational Conditions

- CP-03 Spray Nozzle
  - 0.078 Orifice
  - 30° Deflector
- Pressure
  - 30 psi
- Airspeed
  - 140 mph

Results – First Pass Through Pump
$D_{V0.5}$, EC Blank = 278 µm k

Adjuvant	$D_{V0.5}$, µm	Adjuvant	$D_{V0.5}$, µm
Airex DC	338 h	Direct	368 f
Array	357 g	In-Place	249 m
Border EG 250	403 d	Intac Plus	276 k
Cell-U-Wett	369 f	SanAg 41-A	336 hi
Control	463 c	Strike Zone PPS	371 f
Corral Poly	529 a	Valid	281 k

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Results – First Pass Through Pump
%<200µm , EC Blank = 12.4 % c

Adjuvant	%<200µm	Adjuvant	%<200µm
Airex DC	5.3 gh	Direct	4.0 klm
Array	5.0 hi	In-Place	21.8 a
Border EG 250	3.5 m	Intac Plus	13.1 c
Cell-U-Wett	4.6 ijk	SanAg 41-A	6.2 f
Control	2.6 n	Strike Zone PPS	4.5 ijkl
Corral Poly	1.5 o	Valid	11.6 d

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Results – DSC_1 and DSC_8 ,EC Blank = F
First and Eighth Pass Through Pump

Adjuvant	DSC_1	DSC_8	Adjuvant	DSC_1	DSC_8
Airex DC	F	F	Direct	M	F
Array	M	M	In-Place	F	F
Border EG 250	M	M	Intac Plus	F	F
Cell-U-Wett	M	M	SanAg 41-A	F	F
Control	M	M	Strike Zone PPS	M	M
Corral Poly	C	M	Valid	F	F

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Spray Mix Adjuvants for Spray Drift Mitigation

Summary

- ***Corral Poly*** **provided the largest droplet spectrum and the lowest percentage of driftable fine droplets;** ***Control*** **was second best in improving drift mitigation properties of the EC Blank spray mix**
- **Most of the adjuvants moved the droplet spectra classification from Fine to Medium**
- ***In-Place***, ***Intac Plus***, **and** ***Valid*** **were ineffective in improving drift mitigation properties of the EC Blank spray mix**
- **Four of the five dry-formulated adjuvants did not degrade from eight passes through a gear pump**

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Spray Mix Adjuvants for Spray Drift Mitigation

Summary

- Drift control adjuvant performance information can aid pesticide applicators in selection of drift reducing agents
- The measure of spray drift mitigation attained with drift control adjuvants is a matter that applicators can balance or optimize based on agent performance and economics to achieve drift mitigation goals for a given application

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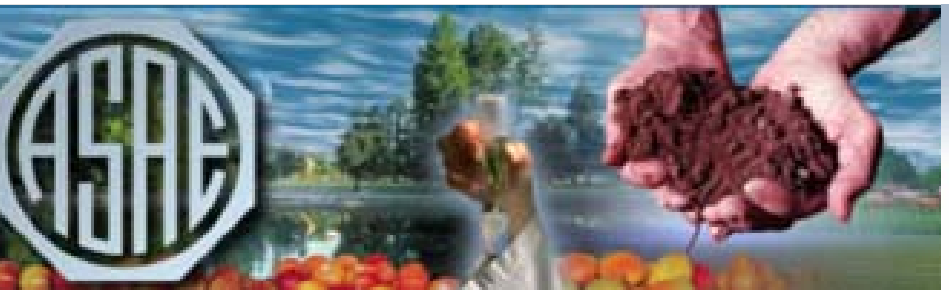
-- Time for Questions --



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